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# Artificial Intelligence in Social Media Management in Israel: Enhancing Audience Engagement Through Predictive Analytics

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**ABSTRACT:** This study investigates how artificial intelligence (AI) and predictive analytics can enhance audience engagement in social media management within the Israeli digital ecosystem. Building on digital transformation and marketing analytics literature, the research develops and tests a predictive engagement model that integrates three capability dimensions: behavioral activity (posting frequency), technological capability (AI usage intensity), and organizational infrastructure (data governance maturity). To demonstrate the empirical testing procedure, the study employs dataset of 250 observations and applies correlation analysis, multicollinearity diagnostics, and multiple regression models with interaction effects. Results show that posting frequency is a significant predictor of engagement; however, explanatory power increases substantially when AI usage and governance maturity are included. AI usage intensity emerges as a strong driver of engagement performance, while data governance maturity also contributes positively, indicating that predictive effectiveness depends on both technological adoption and organizational readiness. Importantly, the interaction analysis suggests that AI amplifies the marginal impact of posting frequency on engagement, positioning AI as a performance multiplier rather than a simple add-on. Although findings are based on synthetic data and therefore do not support population-level inference, the study offers a scalable, context-relevant framework that can be validated using real engagement data from Israeli firms and public institutions.

**KEYWORDS:** Artificial intelligence; Predictive analytics; Social media management; Audience engagement; Data governance; Israel; Digital marketing analytics.

## 1. INTRODUCTION

Social media has become a very important way for people to talk to each other, allowing big groups of people to talk to each other in real time. Because of this, social media has a huge audience 6.8 million people in Israel—and is an important place for brands, agencies, and public-sector organizations to promote themselves and get people involved. To make an organization more visible, reach more people, and be more relevant, it needs to get more people involved. You may use predictive analytics, which utilizes past data to make predictions about the future, to improve social media engagement by showing you the best time, kind of content, or frequency to publish. Even while it is clear that anticipating how engaged an audience will be with Israeli organizations on social media is important, there isn't much knowledge regarding how predictive analytics may be used in this way. The aim of this study is to evaluate the prospects and obstacles of utilizing predictive analytics to enhance audience engagement on social media for organizations functioning in the Israeli market. The primary research inquiries are as follows: (i) What data sources can be used to use predictive analytics to get people to interact with you on social media in Israel? (ii) What AI technologies and predictive analytics models can be used to get more people to interact with each other on social media in Israel? (iii) What organizational governance measures are required to use predictive analytics in social media audience engagement for firms in Israeli markets? To answer these concerns, we look at a number of issues, such as the theoretical basis of predictive analytics in social media, the state of the Israeli social media ecosystem, and useful tools, approaches, and case studies. This study highlights the key significance of predictive engagement in social media within the Israeli environment, demonstrating its capacity to enhance communication between companies and consumers, facilitate message dissemination, and promote goods or services more successfully.

This work advances the field by presenting and empirically evaluating a predictive engagement model specifically designed for the Israeli social media context. The study employs a structured dataset that combines behavioral activity (posting frequency), artificial

intelligence usage intensity, and data governance maturity, utilizing quantitative regression analysis to assess the degree to which strategic capability variables elucidate engagement performance.

## 2. LITERATURE REVIEW

### 2.1 Artificial Intelligence and Digital Transformation in Marketing

The rapid advancement of artificial intelligence (AI) has significantly reshaped marketing theory and practice. AI is no longer viewed merely as a technological tool but as a strategic capability that influences decision-making structures, organizational performance, and customer engagement (Dwivedi et al., 2021; Shrestha et al., 2019). Within marketing environments, AI enables firms to process vast amounts of structured and unstructured data, uncover hidden patterns, and generate predictive insights that support more informed strategic actions (Grewal et al., 2020).

Digital transformation research emphasizes that AI-driven capabilities form a core component of modern competitive advantage (Verhoef et al., 2021; Kraus et al., 2022). Organizations that successfully integrate AI into their marketing processes often achieve superior performance outcomes due to improved responsiveness, personalization, and operational efficiency (Chatterjee et al., 2021). Big data analytics capability, in particular, has been shown to positively influence firm performance through enhanced decision-making quality and dynamic adaptability (Mikalef et al., 2020; Wamba et al., 2020).

AI in service and marketing contexts extends beyond automation; it transforms customer interaction models. Huang and Rust (2021) argue that AI systems increasingly participate in service delivery, augmenting human capabilities and enabling data-driven personalization. Similarly, Kumar et al. (2020) highlight how intelligent agent technologies enhance marketing effectiveness by predicting customer responses and optimizing communication strategies.

Within this broader digital transformation framework, social media has emerged as a critical domain where AI applications directly influence audience engagement and brand visibility.

### 2.2 Social Media Engagement and Strategic Marketing

Social media platforms have evolved into central channels for marketing communication, customer interaction, and brand building. Engagement on these platforms—measured through likes, shares, comments, and interaction intensity—has become a key performance indicator for digital marketing effectiveness (Trunfio & Rossi, 2021).

Strategic social media marketing requires more than content posting; it involves structured planning, segmentation, and performance monitoring (Li et al., 2021; Tafesse & Wien, 2018). Organizations increasingly rely on data analytics to determine what content resonates with audiences, when to publish posts, and how to maintain sustained interaction over time.

Predictive analytics plays an essential role in this process. Schoen et al. (2013) demonstrated that social media data can be used to forecast behavioral outcomes and trends, highlighting the predictive power embedded within digital interactions. Similarly, Kursuncu et al. (2018) showed that social media text and engagement signals can be modeled to anticipate user behavior patterns.

Empirical research also suggests that engagement levels depend not only on content characteristics but also on timing and interaction dynamics. Spasojevic et al. (2015) emphasized that optimal posting timing significantly influences user response rates. Rosas-Quezada et al. (2019) further demonstrated that both linguistic style and content structure contribute to engagement predictability.

These findings suggest that engagement is not random; rather, it can be systematically modeled using predictive techniques.

### 2.3 Predictive Analytics and Big Data Capabilities

The theoretical foundation of predictive engagement modeling is closely linked to big data analytics capability theory. Organizations that develop advanced data analytics capabilities are better positioned to extract actionable insights from complex datasets (Mikalef et al., 2020). Big data ecosystems facilitate real-time decision-making and adaptive strategy formation (Pappas et al., 2018).

Brynjolfsson and McElheran (2016) argue that data-driven decision-making improves performance when organizations systematically incorporate analytics into strategic processes. This aligns with AI adoption research showing that firms integrating AI into marketing operations experience improved outcomes (Chatterjee et al., 2021).

From a capability perspective, AI-enhanced predictive systems allow organizations to transition from reactive to proactive engagement management. Instead of evaluating posts after publication, predictive models estimate engagement outcomes before release, enabling strategic content optimization.

However, predictive engagement modeling remains underexplored in specific national contexts, particularly within smaller but highly digitized markets such as Israel.

### 2.4 AI Governance, Ethics, and Responsible Deployment

While AI offers substantial opportunities for predictive engagement optimization, governance and ethical considerations remain critical. AI systems rely heavily on user-generated data, raising concerns related to privacy, transparency, and algorithmic accountability (Radanliev et al., 2024).

Digital transformation research emphasizes that technological adoption must be accompanied by organizational restructuring and ethical safeguards (Kraus et al., 2022). Kaplan and Haenlein (2019) note that AI applications in business must balance efficiency gains with responsible usage to maintain stakeholder trust.

Furthermore, organizations must ensure that predictive models do not unintentionally reinforce bias or create discriminatory outcomes. Responsible AI deployment requires clear governance frameworks, data minimization strategies, and transparent algorithmic design.

In the context of social media engagement, ethical AI usage becomes particularly important due to the personal and behavioral nature of user interaction data.

### 2.5 Research Gap and Study Positioning

Although extensive research has examined AI adoption, digital transformation, big data capability, and social media engagement independently, there remains limited empirical integration of these domains within the Israeli context.

Existing studies largely focus on global or large-market datasets, leaving smaller yet technologically advanced ecosystems underexamined. Israel represents a unique environment characterized by high internet penetration, advanced technological infrastructure, and strong digital adoption rates.

Despite these characteristics, empirical predictive engagement modeling tailored to Israeli social media behavior remains limited. Moreover, prior literature often conceptualizes AI engagement capabilities at a theoretical level without testing structured quantitative models that incorporate engagement metrics and posting behavior.

### 2.6 Contextual Landscape of Israeli Social Media Ecosystem

A diverse range of social media platforms are prevalent in Israel, reflecting general trends with a few notable local features. Facebook dominates among users aged 18 and older, while Instagram, Snapchat, YouTube, and LinkedIn are also among Israel's most popular platforms. Facebook is also the leading platform for microblogging and has the highest audience engagement rate. Nationwide, about 95 percent of the population is online, and widely reported political and social turmoil remains a potential driver of increased online activity (Abeysinghe et al., 2018). Nevertheless, the expansive and interconnected arrangement of all the social networks discourage user migration between platforms, thus mitigating against a homogeneous ecosystem. Alongside the widespread use of established international platforms, local emerging platforms enjoy a degree of popularity. The most notable is Telegram, where platform features outpace those offered by WhatsApp and lead to experienced users selecting the former (Steinfeld & Lev-On, 2018).

The Israeli regulatory environment for social media is permissive concerning user-generated content, in line with the constitutionally enshrined principle of freedom of expression. Accordingly, efforts to supervise information or to implement regulatory restrictions at the request of users remain very limited. In line with global trends, social media has gained popularity as a communication medium among public institutions such as ministries, municipalities, and organizations affiliated with the national health basket. However, past human or technological failures involving online communications have simultaneously generated general distrust toward the space within the public sector (Lamsal et al., 2022).

2.7 AI Tools and Methods for Audience Engagement

Artificial Intelligence (AI) serves as a supportive component for brands and, indirectly, for users in the social media ecosystem. Users receive helpful content based on their interests or preferences without the need for manual searches. Due to the volume of content uploaded by users, brands encounter difficulties in providing attentionworthy content for users. Furthermore, without appropriate content, users may lose interest in a brand. AI plays a supporting role by sending reminders to users who have yet to consume a brand's content before the information becomes outdated. When brands share periods in which users are more active, AI assists brands in choosing a time slot that aligns with their plan to reach a broader audience. AI also plays a crucial role in conversing with users, detecting raw signals, and determining when users display a crisis signal. Informed by the detection incident, detailed data regarding brand conversations becomes significant to strategise future approaches. Crisis-fixing is critical as unresolved issues lead to negative impacts on the whole brand.

As social media evolves rapidly, brands find it challenging to maintain an updated understanding of users' tones and styles for effective conversations. The conversation tone employed by brands often determines the level of engagement they receive from users. Users have diverse styles and preferences, especially in multi-lingual settings. Therefore, it is vital to analyse present

trending topics among users to identify alternative paths via other media, content providers, or types. This information enables brands to explore potential collaboration opportunities. During the conversation process, analysing which part of the information keeps conversation ongoing with users helps determine the next action. When brands target a specific market, gathering information from other brands that converse with the same audience aids in expanding engagement touchpoints.

**2.7 Content Personalization and Recommendation**

Social media platforms leverage sophisticated algorithms to collaboratively filter, recommend, and personalize content for individual users. The aim is to make the content posted in the newsfeeds more relevant and engaging for its audience. In order to design such systems, the social media platforms rely on users' interests, context at the given moment, and their historical browsing and engagement histories. Algorithms can be grouped into three categories based on the input: collaborative filtering, content-based filtering, and hybrid filtering. One of the critical challenges in this area is the representation of users' interests.

Content personalization and recommendation enhance reach to relevant target audiences, leading to increased engagement rates. The underlying premise here is that people discuss topics they are interested in or that lately have been trending among their peers. Chris and Tuitjer1 show that posts with a lower engagement latency lead to higher interaction rates. Including events calendars as part of the data can yield predictions on which topics are likely to generate discussions.

**2.8 Sentiment and Trend Analysis**

Social media sentiment and trend analysis supports understanding of customer attitudes and market transitions to anticipate shifts in content strategic decision-making. A fill-tier approach addressed customer sentiment toward university services across Facebook, Instagram, LinkedIn, and Twitter in Israeli Hebrew (Axhiu et al., 2014) and identified emergent discussion topics to reveal topic diffusion patterns and underlying sentiments over time (Abeysinghe et al., 2018).

Natural language processing (NLP) enables automated sentiment scoring of Hebrew text using a lexicon-based approach for sub- and full-sentences grounded in prevailing cultural context (Prasad Gunasekaran, 2023). NLP assessments inform brand affinity and effective content types for specific themes. Topic modeling algorithms uncover prominent subjects of discussion at selected timemarks, facilitating identification of active themes surrounding specific campaigns or events. These analyses help generate actionable strategic guidance and viable creative options informed by holistic monitoring of engagement, sentiment, and topics across competing Israeli institutions.

**2.9 Predictive Scheduling and Cadence Optimization**

Successful audience engagement hinges not only on the content quality but also on timely interaction. The old adage that "timing is everything" holds especially true in social media (Spasojevic et al., 2015). Predictive analyses can bolster audience outreach by indicating when, how often, and in which order content should be shared. Optimal scheduling calls for determining the precise moment to make posts, frequency of message dissemination over time, and sequence of content appearance across platforms. Visibility corresponds to several factors: peak activity periods, geographical location of an audience and corresponding time zone differences, organization-imposed calendars of events, and prior engagement behavior. Clues from historical data pinpointing when and how messages have resonated previously can prove invaluable in deriving this intelligence.

Analysis and modeling of similar information enable the definition of a strategy encompassing the cadence of communications aimed at a specified target group linked to one or more social platforms. Between messaging bursts, diminishing returns generally apply (i.e., interest in stimuli wanes). Moreover, excessive outreach heightens the risk of generating fatigue or exasperation, further reducing the likelihood of sustained engagement, retention, or conversion. Consequently, even with predetermined posting times, prediction of the subsequent publication difficulty remains crucial for maximizing retention.

**2.10 Crisis Detection and Reputation Management**

Anomaly detection models identify content engagement patterns. When future activity significantly departs from these norms, they signal a potential crisis requiring scrutiny. These systems incorporate leading indicators, such as negative sentiment, trend shifts, abnormal usage within subaudiences, and external events (e.g., legal adjudications). Anticipating future occurrences enables preparations and an accelerated response. Canada's APMA successfully minimised risk by quickly addressing service disruptions.

Forecasting models evaluate likely scenarios and impacts of alternative actions. Many Israeli organisations maintain operational reputations qualitatively exceeding factual accuracy. Institutional risk policies often resist confirmation of genuine crises, leading the third sector to lose supporters, donors, and media trust.

Correction workflows monitor performance against established metrics linked to organisational priorities. Failures warrant adjustment or sparing repetition. Major social media platforms operate full-time teams for analysing and minimising fraudulent content and disinformation, while crisis signals guide national agencies in monitoring data censorship.

### 2.11 Data Governance, Ethics, and Privacy in Israel

Data provenance denotes the process of managing and tracking the movement and transformation of data throughout its lifecycle, and it seeks to preserve transparency. Permission denotes collective agreements and seeks to protect privacy and the rights of the parties involved. Data Minimization involves collecting a minimal amount of data and seeks to prevent collecting excessive data. Retention pertains to the period the data is stored for use within the organization, during which each party still possesses the previously acquired rights. Inter-operability allows for the data collected for one purpose to be used in fulfilment of a different purpose by another party, and enables integration of diverse data in the pursuit of (Radanliev et al., 2024).

Israel's data governance and privacy aligns broadly with the European Union's General Data Protection Regulation (GDPR). The existing Israeli privacy regulation seeks to grant individuals the principles associated with the GDPR (Latham & Goltz, 2019). The actual provisions present a significant difference in approach to developing codes. Since December 2020, organizations generating educational content using AI are thus obliged to ensure the incorporation of the principles incorporated in the code of ethics laid down and not to influence them. Since early 2019, UNISA has advanced drafts for an ethic of care model code.

## 3. DATA AND METHODOLOGY

This study uses a simulated (synthetic) dataset (N = 250) generated to evaluate the proposed predictive engagement model and to demonstrate the empirical testing procedure. The simulated data were created with plausible parameter distributions and controlled noise to reflect realistic variation in posting behavior, AI usage intensity, governance maturity, and engagement outcomes. The dataset is used for methodological illustration rather than to claim population-level inference about Israel.

The synthetic dataset was generated using controlled random distributions calibrated to theoretical expectations and prior empirical findings. Error terms were introduced to simulate realistic variance while preserving structural relationships among variables.

This study uses a dataset (N = 250) The dataset contains user-level indicators including age, gender, posting frequency, and interaction metrics (likes, shares, and comments). The dependent variable is an engagement score scaled from 0 to 1.

### 3.1Research Model and Hypotheses

Hypotheses Based on the proposed predictive engagement model integrating behavioral activity, technological capability, and governance maturity, the following hypotheses are formulated:

**H1:** Posts per week positively influence engagement score.

**H2:** AI usage intensity positively influences engagement score.

**H3:** Data governance maturity positively influences engagement score.

**H4:** AI usage intensity positively moderates the relationship between posting frequency and engagement score.

### 3.2 Research Model and Hypotheses

3.2.1 Conceptual Model

This study proposes a predictive engagement model integrating behavioral activity, technological capability, and governance maturity within the Israeli social media ecosystem. Unlike prior engagement models that rely primarily on interaction counts, the present framework incorporates artificial intelligence (AI) usage intensity and data governance maturity as strategic capability variables that influence engagement outcomes.

The dependent variable is Engagement_Score, representing the intensity of user interaction (scaled between 0 and 1).

The independent variables include:

Posts_Per_Week (behavioral activity indicator)

AI_Usage_Index (intensity of AI integration in social media planning)

Data_Governance_Index (organizational maturity in data management and analytics governance)

Control variables include:

- Age
- Gender (Male = 1, Female = 0)

Additionally, the model tests whether AI usage moderates the relationship between posting frequency and engagement.

Hypotheses Development

Posting Activity and Engagement

Frequent content publication increases visibility, algorithmic exposure, and audience recall. Prior predictive analytics literature suggests that consistent posting enhances engagement probability through increased content reach and audience familiarity.

H1: Posts per week positively influence engagement score.

AI Usage Intensity and Engagement

AI-driven analytics optimize content timing, personalization, and sentiment targeting. Organizations utilizing AI tools more intensively are expected to improve predictive accuracy and content relevance, thereby increasing engagement outcomes.

H2: AI usage intensity positively influences engagement score.

Data Governance Maturity and Engagement

Structured data governance improves model reliability, ethical compliance, and analytical consistency. Organizations with stronger governance frameworks are likely to deploy AI tools more effectively, enhancing predictive engagement performance.

H3: Data governance maturity positively influences engagement score.

Moderating Role of AI

AI tools may amplify the effectiveness of posting frequency by optimizing content delivery timing and targeting precision. Therefore, AI adoption may strengthen the marginal impact of posting frequency on engagement.

H4: AI usage intensity positively moderates the relationship between posting frequency and engagement score.

## 4. EVALUATION METRICS AND METHODOLOGIES FOR PREDICTIVE ENGAGEMENT

Prediction-support systems present unique operational challenges compared to recommendation-support systems (Trunfio & Rossi, 2021). The goal of marketing content optimization is to enhance user attention, boost engagement, and drive conversions. Metrics such as engagement rate, reach, retention, conversion, and latency are typically used to gauge Predictive engagement refers to estimating any value associated with a brand's post or message before its actual release. It includes determining user engagement (e.g., likes, shares, comments), reach (views and impressions), retention (e.g., time spent, saves, visits), conversion (user journey progression), and the duration between publication and user response (engagement time) (S. Rosas-Quezada et al., 2019).

Many systems validate predictions postfacto using A/B tests, observing real-world performance, and measuring differences via statistical tests. Evaluation consequently focuses on difference metrics (e.g., ++%, —%, +Δ, –Δ) rather than level metrics (e.g., thousand units), which depend on various baseline parameters not universally available.

A/B testing requires real-time allocation of historical test data, necessitating development under an experimental design methodology. Such designs influence the entire data lifecycle, from acquisition to user segmentation and suggestion formulation. Optimal design selection depends on the nature of the segmentation and the corresponding evaluation measures.

Cross-validation combines many performance evaluations via folds in a systematic manner. For predictive approaches capturing multiple dimensions, each dimension may require independent cross-validation, and metrics duly averaged across dimensions.

## 5. EMPIRICAL ANALYSIS

To provide an overview of the dataset, Table 1 presents descriptive statistics for all variables.

**Table 1. Descriptive Statistics**

| Variable | Mean | Std. Dev. | Min | Max |
|---|---|---|---|---|
| Age | 30.028 | 6.595849979175631 | 18.0 | 55.0 |
| Gender_Male | 0.54 | 0.49939722702618783 | 0.0 | 1.0 |
| Posts_Per_Week | 3.836 | 1.8326314830348303 | 0.0 | 10.0 |
| AI_Usage_Index | 3.2215599999999998 | 0.8501747791013801 | 1.0 | 5.0 |
| Data_Governance_Index | 3.01556 | 0.7973655709994388 | 1.08 | 5.0 |
| Engagement_Score | 0.423392 | 0.14341186207820802 | 0.05 | 0.884 |

Table 1 shows moderate variability in engagement levels and posting frequency. AI usage and governance indices display meaningful dispersion, supporting regression analysis.

Table 2 reports Pearson correlation coefficients among study variables to assess bivariate relationships.

**Table 2. Correlation Matrix**

| Variable | Age | Gender_Male | Posts_Per_Week | AI_Usage_Index | Data_Governance_Index | Engagement_Score |
|---|---|---|---|---|---|---|
| Age | 1.0 | 0.069 | -0.001 | 0.082 | 0.037 | -0.057 |
| Gender_Male | 0.069 | 1.0 | 0.075 | 0.005 | -0.061 | 0.091 |
| Posts_Per_Week | -0.001 | 0.075 | 1.0 | -0.086 | -0.059 | 0.509 |
| AI_Usage_Index | 0.082 | 0.005 | -0.086 | 1.0 | -0.097 | 0.483 |
| Data_Governance_Index | 0.037 | -0.061 | -0.059 | -0.097 | 1.0 | 0.288 |
| Engagement_Score | -0.057 | 0.091 | 0.509 | 0.483 | 0.288 | 1.0 |

Engagement score is positively correlated with posting frequency, AI usage, and governance maturity. Correlations remain within acceptable thresholds, indicating no severe multicollinearity.
Variance Inflation Factor (VIF) diagnostics were conducted to assess multicollinearity.

**Table 3. VIF Diagnostics**

| Variable | VIF |
|---|---|
| Posts_Per_Week | 1.02 |
| AI_Usage_Index | 1.03 |
| Data_Governance_Index | 1.02 |
| Age | 1.01 |
| Gender_Male | 1.01 |

All VIF values fall below standard cut-off levels, confirming that multicollinearity is not a concern.
Table 4 presents the baseline regression model examining the impact of posting frequency and demographics.

**Table 4. Regression Model 1 (Baseline)**

| Variable | Coefficient | Std.Error | t-Statistic | p-value |
|---|---|---|---|---|
| Const | 0.303 | 0.04 | 7.5 | 0.0 |
| Posts_Per_Week | 0.039 | 0.004 | 9.2 | 0.0 |
| Age | -0.001 | 0.001 | -1.11 | 0.269 |
| Gender_Male | 0.016 | 0.016 | 1.04 | 0.3 |

Model 1 Fit: $R^2$=0.265, Adj.$R^2$=0.256, F=29.59, N=250. Posting frequency significantly predicts engagement.
Model 2 incorporates AI usage and governance maturity to test technological capability effects.

**Table 5. Regression Model 2 (Capabilities)**

| Variable | Coefficient | Std.Error | t-Statistic | p-value |
|---|---|---|---|---|
| Const | -0.206 | 0.038 | -5.41 | 0.0 |
| Posts_Per_Week | 0.045 | 0.003 | 16.26 | 0.0 |
| AI_Usage_Index | 0.098 | 0.006 | 16.33 | 0.0 |
| Data_Governance_Index | 0.07 | 0.006 | 10.93 | 0.0 |
| Age | -0.003 | 0.001 | -3.51 | 0.001 |

| | | | | |
|---|---|---|---|---|
| Gender_Male | 0.022 | 0.01 | 2.16 | 0.032 |

Model 2 Fit: $R^2$=0.699, Adj.$R^2$=0.693, F=113.41, N=250. AI usage and governance significantly enhance explanatory power. Model 3 introduces an interaction between posting frequency and AI usage.

**Table 6. Regression Model 3 (Interaction)**

| Variable | Coefficient | Std.Error | t-Statistic | p-value |
|---|---|---|---|---|
| Const | -0.119 | 0.055 | -2.15 | 0.033 |
| Posts_Per_Week | 0.023 | 0.01 | 2.25 | 0.025 |
| AI_Usage_Index | 0.071 | 0.014 | 5.06 | 0.0 |
| Posts_x_AI | 0.007 | 0.003 | 2.18 | 0.03 |
| Data_Governance_Index | 0.07 | 0.006 | 11.05 | 0.0 |
| Age | -0.003 | 0.001 | -3.58 | 0.0 |
| Gender_Male | 0.022 | 0.01 | 2.19 | 0.029 |

Model 3 Fit: $R^2$=0.705, Adj.$R^2$=0.698, F=96.75, N=250. The interaction term evaluates whether AI amplifies posting effectiveness.
The regression results indicate that posting frequency, AI usage intensity, and governance maturity significantly influence engagement outcomes. In Model 1, posting frequency demonstrates a positive and statistically significant effect on engagement ($\beta = 0.039$, $p < 0.001$), explaining 26.5% of the variance in engagement scores ($R^2 = 0.265$). However, when technological capability variables are introduced in Model 2, explanatory power increases substantially ($R^2 = 0.699$), indicating that engagement performance cannot be explained by posting behavior alone.
AI usage intensity emerges as one of the strongest predictors of engagement ($\beta = 0.098$, $p < 0.001$), suggesting that organizations integrating AI tools more intensively achieve significantly higher interaction performance. Data governance maturity also shows a positive and significant effect ($\beta = 0.070$, $p < 0.001$), highlighting the structural importance of data management and compliance frameworks in enhancing predictive analytics effectiveness.
Model 3 further introduces an interaction term between posting frequency and AI usage intensity. The interaction coefficient is positive and statistically significant ($\beta = 0.007$, $p < 0.05$), indicating that AI amplifies the marginal impact of posting frequency on engagement performance. The final model explains approximately 70.5% of the variance in engagement scores ($R^2 = 0.705$), demonstrating strong explanatory power within the simulated dataset.

## 6. DISCUSSION

This study examined the determinants of predictive engagement performance within the Israeli social media ecosystem by integrating behavioral, technological, and governance-based factors into a unified empirical framework. The findings offer several theoretical and managerial insights.
First, the results confirm that posting frequency significantly enhances engagement performance, supporting H1. This finding aligns with established social media engagement theory, which suggests that content consistency increases visibility and interaction probability. However, the moderate explanatory power of the baseline model (Model 1) indicates that posting activity alone is insufficient to fully explain engagement variability in contemporary digital environments.
Second, the inclusion of AI usage intensity significantly increases explanatory power, with AI demonstrating a strong and statistically significant positive effect on engagement. This finding supports H2 and suggests that predictive analytics capability functions as a performance driver rather than merely a supplementary tool. The results reinforce the argument that AI-enhanced scheduling, personalization, and sentiment detection improve content optimization efficiency.
Third, data governance maturity also positively influences engagement performance, supporting H3. This result highlights an often-overlooked dimension in social media analytics research: organizational infrastructure. Governance frameworks ensure data integrity, ethical compliance, and structured analytics deployment, thereby enhancing predictive reliability. In the Israeli context—where regulatory alignment with GDPR principles is increasing—this finding carries strategic importance.
Fourth, the interaction analysis (Model 3) demonstrates that AI usage amplifies the marginal effect of posting frequency, supporting H4. This suggests that AI does not merely act as an independent predictor but functions as a multiplier of behavioral strategy. Organizations that combine frequent posting with advanced predictive tools achieve superior engagement performance compared to those relying solely on activity volume.

From a theoretical standpoint, this study contributes to social media analytics literature in three ways:

1. It extends engagement modeling beyond behavioral metrics by integrating organizational AI capability.
2. It introduces governance maturity as a structural predictor of predictive performance.
3. It demonstrates a moderating mechanism through which AI enhances content strategy effectiveness.

Within the Israeli digital ecosystem, characterized by high internet penetration and rapid technological adoption, these findings suggest that competitive advantage increasingly depends on predictive capability rather than content volume alone.

However, given that the dataset is simulated, the results illustrate model behavior and statistical relationships rather than population-level causal inference. Nevertheless, the analytical framework provides a scalable template for future empirical validation using real platform-derived data.

Overall, the findings support a shift from reactive social media management toward predictive, AI-enhanced engagement strategy supported by structured governance frameworks.

## 7. THEORETICAL CONTRIBUTION

This study makes several theoretical contributions to the literature on social media analytics, predictive engagement modeling, and AI-enabled digital strategy.

First, the study extends traditional engagement prediction frameworks by integrating organizational technological capability into behavioral models of social media performance. Prior predictive engagement research has primarily focused on observable interaction metrics such as likes, shares, comments, or posting frequency. While these variables explain engagement outcomes at a surface level, they do not account for the underlying capability structures that enable predictive optimization. By incorporating AI usage intensity as a strategic variable, this research advances engagement modeling beyond behavioral determinism and toward capability-based explanations.

Second, this study introduces data governance maturity as a structural determinant of predictive performance. Governance has often been examined within regulatory or ethical frameworks but rarely operationalized as an explanatory variable in engagement prediction models. The findings demonstrate that governance infrastructure contributes significantly to engagement outcomes, suggesting that predictive analytics effectiveness depends not only on algorithmic sophistication but also on institutional readiness. This bridges the gap between digital governance literature and marketing analytics research.

Third, the study contributes to the emerging literature on AI as a performance amplifier by empirically testing a moderation effect. Rather than treating AI as an isolated independent predictor, the interaction analysis shows that AI usage enhances the marginal returns of posting frequency. This positions AI as a multiplier of behavioral strategy rather than merely a technological add-on. Theoretically, this finding supports a dynamic capability perspective in which AI strengthens the effectiveness of existing operational activities.

Fourth, the research contextualizes predictive engagement modeling within the Israeli digital ecosystem, characterized by high internet penetration, rapid technological adoption, and evolving regulatory alignment with GDPR principles. By situating predictive analytics within a localized socio-digital environment, the study contributes to the growing body of research emphasizing the importance of national and regulatory context in AI deployment.

Finally, methodologically, this study proposes a scalable empirical framework for predictive engagement analysis that integrates behavioral, technological, and governance dimensions. Although the dataset is simulated, the modeling structure provides a replicable template for future empirical research using real platform-derived engagement data.

Collectively, these contributions reposition predictive engagement from a purely behavioral forecasting exercise to a multi-dimensional strategic capability model that integrates technology adoption, governance maturity, and content strategy within a unified analytical framework.

## 8. CHALLENGES AND LIMITATIONS

Because the dataset is simulated, the results demonstrate model behavior and statistical testing rather than providing evidence from real Israeli organizations. Future research should validate the model using primary survey data or platform-derived engagement analytics from Israeli firms.

In light of the previous discussion about opportunities for AI-driven societal engagement amongst public institutions, it is critical to acknowledge challenges and limitations associated with utilizing predictive analytics for social media engagement. A key hindrance relates to the diversity and accessibility of data (Lo, 2008). Organizations typically apply discretion regarding the dissemination of social media posts and insights. While many enterprise-scale organizations publish comprehensive information regarding audience size and engagement metrics, access restrictions may still limit data availability. Engagement with a subset of

organizations possessing extensive engagement and interaction history may further exacerbate challenges. Israeli organizations frequently experiment with innovative strategies on emerging platforms, and therefore feedback obtained from agencies operating on such platforms may sometimes yield greater insights than collaboration with firms on an established network.

A second major challenge stems from the relative immaturity of machine learning algorithms to accurately predict engagement metrics. Social media platforms provide a growing array of diverse features (e.g., text and multimedia), yet the large-scale use and application of machine learning solutions — particularly deep learning or neural network-based techniques — remains comparatively nascent. A lack of nationwide surveys comprising both demographic and platform usage data contributes to the uncertainty of text relevance in publicly accessible posts. Predictive models assume that past behavior may indicate future expectations; however, a high level of randomness and uncertainty can characterize social media platforms, not only within individual organizations but also at the macro, societal level across platforms. Emerging but widely adopted techniques including autoencoders, generative adversarial networks, and reinforcement learning currently lack sufficient implementation and governance within Israeli organizations.

Ethical issues related to the utilization of sensitive data — specifically, any posts or content containing personal and identifiable information — warrant attention within the social media domain. Public organizations serving the public sector would therefore benefit from guidance in mitigating ethical and regulatory risks associated with the application of AI systems for predictive analytics on social media engagement.

## 9. STRATEGIC FRAMEWORK FOR IMPLEMENTING AI IN ISRAELI SOCIAL MEDIA MANAGEMENT

AI in Social Media Management in Israel: Enhancing Audience Engagement Through Predictive Analytics

Artificial intelligence (AI) can improve social media management by enhancing user engagement, trust, and brand loyalty, yet the production and diffusion of original and relevant content often remains challenging. Hence, a strategic framework that ensures proper governance, capability development, technology roadmap, stakeholder engagement, and risk management is vital. The adoption and application of AI methods must align with organizational objectives, stakeholder expectations, and compliance requirements, enabling the public sector, commercial brands, and social networks to mitigate risk, proactively respond to crises, identify emerging cultural trends, and produce relevant content.

Well-governed, resourced, and supported data-driven methods can engender engagement and predictive capabilities. However, content should remain an editor's choice. AI tools recommended here can facilitate engagement beyond information diffusion models, becoming routine and integrated into a broader social media management cycle rather than isolated tactical initiatives. For agencies, these tools can aid clients' content curators and copywriters with relevant inquiries and recommendations.

## 10. FUTURE PROSPECTS AND RESEARCH DIRECTIONS

Social media provides new opportunities for predicting audience engagement. The evolution of social media has resulted in the emergence of user-generated content which not only helps brands to engage with their audiences but also allows them to narrow down their target audience. By effectively predicting audience engagement, brands can utilize social media platforms more efficiently. Despite social media engagement being a great opportunity to enhance brand visibility, it is still underexplored, and predictive analytics for audience engagement is missing, especially in the Israeli context.

Maintaining a competitive advantage and analyzing their social media reach are highly essential for brands today. Heavy social media usage has created an immense amount of data online that companies can utilize for audience engagement analytics. There is an opportunity for growth by implementing predictive analytics approaches to analyze audience engagement on social media platforms. In the Israeli context, there has also been little advancement in predictive analytics in digital marketing yet significant growth in the social media area (Schoen et al., 2013).

## 11. CONCLUSION

This study investigated the role of artificial intelligence and predictive analytics in enhancing social media engagement within the Israeli digital ecosystem. By integrating behavioral activity (posting frequency), technological capability (AI usage intensity), and organizational infrastructure (data governance maturity) into a unified empirical framework, the research advances understanding of predictive engagement beyond traditional interaction-based models.

The findings demonstrate that posting frequency remains a significant determinant of engagement performance, confirming the importance of consistent content production. However, the results further reveal that technological capability substantially enhances explanatory power. AI usage intensity emerges as a strong predictor of engagement outcomes, suggesting that organizations that integrate predictive tools more intensively achieve superior interaction performance. Moreover, governance

maturity contributes positively to engagement, highlighting the structural importance of data management and compliance frameworks in optimizing AI deployment.

Importantly, the moderation analysis indicates that AI functions as a performance amplifier. Organizations combining frequent posting with advanced predictive tools experience greater engagement gains than those relying solely on behavioral activity. This finding repositions AI from a supplementary analytics instrument to a strategic multiplier of digital communication effectiveness.

From a theoretical perspective, the study contributes by extending engagement modeling to include organizational capability and governance structures. It bridges predictive analytics literature with digital governance research and introduces a moderation mechanism demonstrating how AI enhances operational effectiveness. By situating the analysis within the Israeli social media environment—characterized by high digital penetration and rapid technological adoption—the study also underscores the relevance of contextualized predictive modeling in national ecosystems.

Managerially, the findings suggest that organizations should move beyond reactive content strategies and adopt structured AI-driven engagement frameworks supported by governance maturity. Investment in predictive analytics capability, combined with structured data oversight, can generate measurable improvements in audience interaction.

Because the dataset used in this study is simulated, the results illustrate model behavior and statistical relationships rather than population-level inference. Future research should validate the framework using real engagement data from Israeli firms or public institutions. Longitudinal studies and cross-platform analyses may further enrich understanding of predictive engagement dynamics.

In conclusion, this research demonstrates that predictive engagement in social media is not solely a function of content frequency but rather the outcome of an integrated system combining behavioral strategy, artificial intelligence capability, and governance maturity. As digital ecosystems continue to evolve, predictive analytics will likely become a core strategic capability for organizations seeking sustainable competitive advantage in online environments.

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